ENVIRONMENTAL JUSTICE PILOT PROJECT
PROTOCOL FOR PEST MANAGEMENT ASSESSMENT

May 2, 2006

PREPARED BY
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DEPARTMENT OF PESTICIDE REGULATION

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PM-06-01

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1. INTRODUCTION

1.1 Background

The California Environmental Protection Agency (Cal/EPA) is committed to integrating environmental justice (EJ) into all its programs, policies, and actions. EJ is defined in statute as:

> The fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws and policies.

As part of Cal/EPA's Environmental Justice Action Plan, the Department of Pesticide Regulation (DPR) is conducting a pilot project focusing on ambient air concentrations of pesticides in the Fresno County community of Parlier. The objectives of the pilot project, the pesticides concerned, and the choice of a community for pesticide monitoring have been described in detail by DPR (2005). A separate protocol describes the air monitoring that will be conducted in Parlier for a year starting January 1, 2006 (Segawa, Wofford and Ando 2006).

A key goal of the pilot project is to answer these questions:

- Are Parlier residents exposed to pesticides in the air?
- Which pesticides are people exposed to? In what amounts?
- Are the amounts of pesticides found in air of concern to human health, particularly for children?

Additional goals are to:

- Tell the community about the project.
- Evaluate pesticide risk in relation to risk from other pollutants that are monitored.
- Reduce pesticide risk.
- Follow up on the findings.

This pest management assessment is part of DPR's pilot project. It will provide background on the crops grown in the study area and the pest management practices used. It could also lay the groundwork for proposing follow-up actions to support local pest managers who wish to evaluate and adopt environmentally friendly pest management practices.

This is in line with DPR's mission to protect human health and the environment by fostering reduced-risk pest management, and with Cal/EPA and DPR's commitment to a precautionary approach to protecting human and environmental health. The term "precautionary approach" can be defined many ways. Cal/EPA has adopted a working definition for all the pilot projects:

> "Precautionary approach means taking anticipatory action to protect public health or the environment if a reasonable threat of serious harm exists based upon the best available science and other relevant information, even if absolute and undisputed scientific evidence is not available to assess the exact nature and extent of risk."

The working definition may be modified as the pilot projects progress. It is also being further developed by an additional pilot project specifically devoted to the precautionary approach, led by the Integrated Waste Management Board.

Typically, DPR pest management initiatives are:

- Non-regulatory, with voluntary participation by growers and other pest managers.
- Collaborative, grant-funded applied research, demonstration, education, and/or implementation projects. In agriculture, growers, industry, farm advisors and other scientists work together on-farm.
- Strong on farmer-to-farmer outreach through meetings, field days, and demonstration crops.
- Focused on economics, effectiveness, and equity in protecting human health and the environment. The idea is to help participating pest managers improve their operations while reducing human and environmental exposure to pesticides.

Many pest management initiatives have already been implemented by DPR, including projects in walnuts, wine grapes, almonds and other stone fruits, citrus, and the containerized nursery industry, and for IPM in schools.

A good example of this kind of project is a 2004-2006 effort funded by the U.S. Environmental Protection Agency (U.S. EPA). Under this project, "Reducing Use of FQPA (Food Quality Protection Act)-Targeted Pesticides in Stone Fruit Orchards in California's San Joaquin Valley," DPR, the University of California (UC) at Davis, the UC Statewide IPM Program, and the California Tree Fruit Agreement have partnered with progressive stone fruit producers in the Parlier area to field-test and demonstrate less-hazardous pest management practices, and to develop a Tree Fruit Seasonal Guide for environmentally friendly production based on local grower experience. A project extension to 2008 will add work with Smart Sprayers and remote sensing-guided pest management operations. Using practices that project growers have already field-validated, stone fruit producers can reduce their use of organophosphate and carbamate pesticides, comply with proposed dormant spray regulation changes and new wastewater discharge restrictions, and minimize volatile organic compound (VOC) emissions.

1.2 Site Description

The pest management assessment covers the same project area that the overall Environmental Justice Pilot Project does: the area within an approximate five-mile radius of the Parlier city limits. This area contains the cities of Parlier, Reedley, and Selma as well as the southern portion of Sanger, the northern end of Kingsburg, and some smaller communities such as Del Rey. These are all rural communities surrounded by agriculture.

As described in DPR's project protocol (Segawa, Wofford and Ando, 2006), Parlier is a small city (approximately 1.6 square miles in area) located in the San Joaquin Valley approximately 20 miles southeast of Fresno (Figure 1). Parlier has an elevation of approximately 340 feet, with about 13 inches of rain per year. Temperatures typically range from 60-96 ^{o}F during the summer and 35-50 ^{o}F during the winter. Winds are most frequently from the northwest at 5-8 miles per hour (Figure 2).

According to the City of Parlier Economic Development Department (2005), the total population of Parlier is 12,167 and 43,719 people live within a 5-mile radius. The 2000 U.S. census reports that approximately 38 percent of the population is less than 18 years old, and 97 percent are Hispanic. The median family income is $24,275 per year.

In California, certain pesticide uses must be reported to DPR. All agricultural pesticide use is subject to the reporting requirements, along with commercial applications to turf, buildings, and urban landscapes. Most industrial and institutional uses are exempt from reporting, as are all home-and-garden uses by non-professional applicators.

In DPR's pesticide use reporting (PUR) database, agricultural applications are recorded by geographical location; non-agricultural applications are reported only at the county level. The Environmental Justice Pilot Project will take nonagricultural pesticide use into account as far as available information allows, but because of the limitations of the PUR, actual nonagricultural pesticide use in the Parlier area can only be estimated.

The pest management assessment will include pesticide use and other pest control practices in production agriculture. Raisin, table, and wine grapes and stone fruit (nectarines, peaches, plums) are the major crops grown around Parlier. In 2004, over 200 pesticide chemicals were used for agricultural production within the project area, although only 10 pesticides accounted for 90% of total reported use by pounds. Total reported agricultural use in 2004 was 2.4 million pounds of active ingredient (a.i.) applied cumulatively on 768,000 acres. Table 1 lists the 25 most-used pesticides, by weight in 2004, with reported agricultural use from 2000 to 2004. Insecticides and fungicides are the most heavily used.

1.3 Goal and Objectives

The overall goal of the pest management assessment is to study and describe the current state of pest management in the Parlier area, including key crops, pests, associated pesticide use, and potential alternative pest management systems. The information will be used to attain the following objectives:

- Help interpret project air monitoring findings.
- Better inform the community about local pest management needs and practices.
- Lay the foundation for strengthening DPR assistance to Parlier area pest managers who are interested in adopting environmentally friendly practices. Many of them need more flexibility and the ability to comply with regulations without suffering economic hardship.

Figure 1. Map showing Parlier approximately 20 miles southeast of Fresno.

Figure 2. Summary of wind direction and wind speed during 2004 at the San Joaquin Valley Air Pollution Control District monitoring station, approximately 0.5 miles southeast of Parlier. The direction of the spokes indicates the direction the wind is coming from. The length of the spokes indicates the percentage of time in that direction. The width and color of the spokes indicates the wind speed.

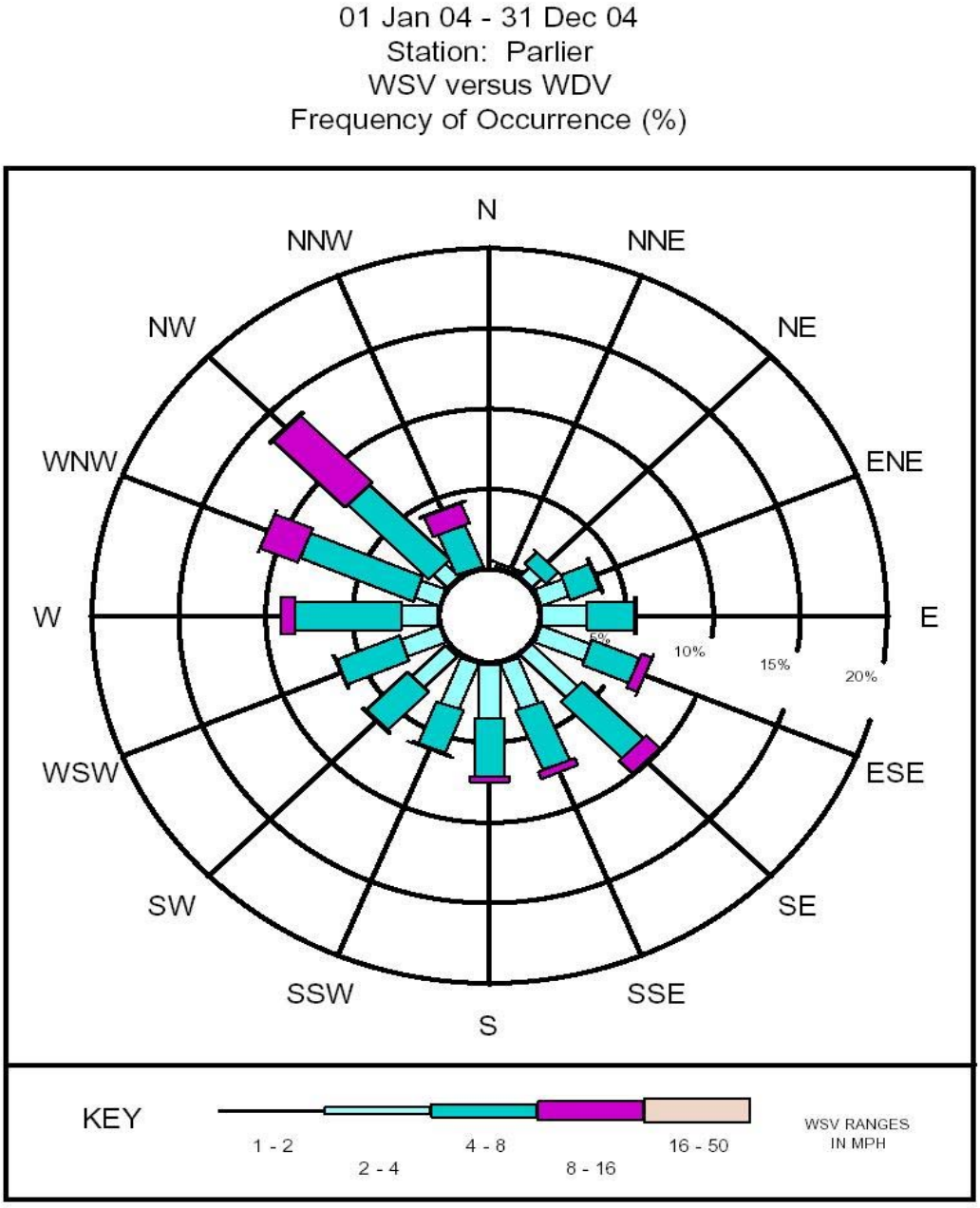

Table 1. Reported use in pounds of pesticide active ingredient in a 5-mile radius of Parlier, CA, from 2000 to 2004, of the 25 most used pesticides in 2004. Data from DPR's Pesticide Use Reports.

AI	2000	2001	2002	2003	2004
SULFUR	1,627,484	1,015,763	1,121,936	848,406	933,692
PETROLEUM OIL, UNCLASSIFIED	699,181	486,593	554,594	497,167	472,833
1,3-DICHLOROPROPENE	148,446	263,184	242,285	248,546	224,603
MINERAL OIL	97,334	87,029	286,502	287,998	180,952
PETROLEUM DISTILLATES, REFINED	144,997	163,593	16,694	5,005	126,190
CRYOLITE	203,684	123,598	92,199	80,912	73,851
COPPER HYDROXIDE	127,900	86,577	88,005	67,149	62,978
ZIRAM	55,507	43,724	38,928	31,076	40,340
GLYPHOSATE, ISOPROPYLAMINE SALT	40,448	42,286	44,736	29,950	38,138
PHOSMET	22,241	40,641	40,671	32,118	36,965
METAM-SODIUM	9,761	11,528	26,273	15,468	26,670
CHLORPYRIFOS	34,559	25,656	27,782	25,132	26,149
METHYL BROMIDE	96,096	16,757	21,636	36,742	23,753
COPPER OXIDE (OUS)	18,226	19,364	21,722	23,252	22,311
SIMAZINE	17,042	14,997	14,260	12,062	13,076
PARAQUAT DICHLORIDE	12,374	12,494	14,953	6,637	10,635
ALPHA-(PARA-NONYLPHENYL)-OMEGA-HYDROXYPOLY(OXYETHYLENE)	3,391	3,166	5,054	9,289	9,794
PROPARGITE	27,321	15,325	10,677	9,212	6,481
KAOLIN		428	588	333	5,914
ORYZALIN	10,343	1,940	548	2,615	5,253
GLYPHOSATE, DIAMMONIUM SALT			23	1,798	5,236
2,4-D, DIMETHYLAMINE SALT	1,849	1,145	3,585	1,887	5,022
OXYFLUORFEN	5,903	5,508	5,056	3,977	4,728
IPRODIONE	8,447	6,046	4,802	5,372	4,696
ALPHA-ALKYLARYL-OMEGA-HYDROXYPOLY(OXYETHYLENE)	8,781	11,328	11,469	3,979	4,388

The pest management assessment findings and recommendations may form the basis for developing a project proposal for which DPR could seek future funding. The proposal could complement DPR's 2004-2008 FQPA project, which is already supporting grower-participatory evaluation and promotion of environmentally friendly pest management practices for stone fruit orchards in the Parlier area (see 1.1 above).

2. PROJECT PERSONNEL

Key personnel for this pest management assessment include:

Pest Management Assessment:	Pat Matteson, Project Leader Associate Environmental Research Scientist, DPR (916) 445-4239 pmatteson@cdpr.ca.gov Larry Wilhoit Senior Environmental Research Scientist, DPR (916) 324-4271 lwilhoit@cdpr.ca.gov
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Environmental Justice Coordinator:	Veda Federighi Assistant Director, DPR (916) 445-3974 vfederighi@cdpr.ca.gov

3. INFORMATION COLLECTION

3.1 Pesticide Use Patterns

Initially at least, the pest management assessment will focus on grapes (table, wine, and raisin grapes) and stone fruit (nectarines, peaches, and plums), including preplant fumigant use. PUR data show that those crops accounted for about 90 percent of all pesticide use by weight (pounds of active ingredient), and 95 percent of acres treated with pesticides within the project area. Pesticide use on those crops may be even higher if some applications reported as soil fumigation or on uncultivated land were on fields that were subsequently planted to them. Parlier air monitoring data may suggest additional pesticide use situations to be considered in the assessment.

3.2 Information to Be Collected

Information collected for the pest management assessment will include the following:

- Pest problems and damage, with emphasis on major pests, plant diseases, and weeds.
- Pest management practices, both current practices of the majority of pest managers and potential environmentally friendly alternatives. Some examples of alternative practices are: biological and cultural pest control methods such as pheromone disruption, the release of parasitoids or predators of insect pests, and cleaning up plant debris that may harbor pests and disease; "soft" pesticides (those posing less environmental risk); the employment of professional pest control advisors (PCAs), crop and pest models, and/or remote sensing technologies for improved field monitoring and better choice and timing of pest control actions; and more efficient pesticide application equipment that directs spray more accurately at an appropriate dosage, thereby reducing pesticide drift and unnecessary pesticide use.
- Gaps in research, demonstration, education, and outreach, including obstacles to the adoption of less-hazardous pest management practices.
- Candidate sources of technical advice and potential financial support for the development and field verification of alternative pest management practices and the education of growers and other pest managers, PCAs, and other stakeholders.
- Any additional information that could help growers and other pest managers improve their operations and get out in front of regulations and restrictions by taking advantage of new techniques and information.

3.3 Information Sources

A multidisciplinary and multisectoral range of stakeholders will be consulted during the information gathering process. Among them will be the following:

- Growers.
- Grower organizations.
- Commodity groups and other marketing organizations.
- Industry and agribusiness, including food and beverage companies and producers of "green" farming equipment, supplies, and services.
- Pest Control Advisors and Pest Control Operators.
- Nonprofit organizations, especially those promoting sustainable agriculture.
- Researchers, Farm Advisors, and other scientists. In particular, advice will be sought from the UC Statewide IPM Program and Fresno County specialists including those working at the UC Kearney Agricultural Center and the U. S. Department of Agriculture (USDA) Agricultural Research Service (ARS) San Joaquin Valley Agricultural Sciences Center.
- Other U. S. Department of Agriculture agencies, such as the Natural Resources Conservation Service (NRCS). NRCS provides technical and financial support for growers who want to adopt conservation practices including less-hazardous pest management methods.

- County Agricultural Commissioners (Fresno and Tulare Counties).
- Other government agencies and quasi-governmental organizations involved in environmental protection, outreach to growers, and sustainable agriculture, including county Resource Conservation Districts and the Kings River Conservation District.

3.4 Information Collection Methods

Information for the assessment will be collected in several ways.

- Review of scientific, professional, and trade literature, including scientific reports and other relevant literature, UC IPM publications, journals, periodicals, and websites.
- Stakeholder interviews will be conducted by telephone, by e-mail, or in person. To the extent possible, in-depth interviews will be conducted during site visits to key informants. Informants will be asked to recommend other people or organizations to contact, as appropriate for the objectives of the assessment.
- Analysis of information drawn from DPR agricultural, health, environmental, and regulatory databases, including Pesticide Use Reports.
- Use of geographic information system (GIS) maps of the Parlier area as a tool for analyzing crops and pesticide use. The UC Davis Agricultural Geographic Information Systems (AGIS) Laboratory can produce maps with a 1 sq mi resolution. The Fresno and Tulare County Agricultural Commissioners may be able to supply more detailed crop maps.

4. DATA ASSESSMENT

Pest management in grapes and stone fruit crops will be addressed from the beginning. DPR's Pest Management Analysis and Planning group will consult with other branches of DPR and County Agricultural Commissioners on an ongoing basis, in order to better characterize these pesticides and pest management settings.

Fact finding for the assessment will be conducted simultaneously with air monitoring in Parlier, which will take place during the calendar year 2006. Because there is a three-month turnaround time for air sample analysis, complete air monitoring data for the Parlier area will not be available until April 2007. Thus air monitoring could influence the scope of crops, pesticides, or pesticide use patterns until quite late in the assessment process. Certain best management practices (BMP) may be highlighted in the final assessment with a view to increasing air quality benefits.

5. SCHEDULE

The following is the estimated schedule for completing the pest management assessment. All dates are subject to change. Periodic informal oral progress reports will be presented to the Technical and Local Advisory Groups (TAG and LAG) of the Environmental

Justice Pilot Project. Group members will have the opportunity to ask questions and make suggestions.

Activity	Start Date	End Date
Write protocol	April 14, 2005	April 2006
Collect information	June 9, 2005	April 2007
Public forum in Parlier	January 28, 2006	
Conduct data assessment	February 2006	August 2007
First oral progress report	May 2006	
Second oral progress report	October 2006	
Third oral progress report	April 2007	
Write final report	July 2007	Fall/winter 2007
Participate in public forum	Fall/winter 2007	

6. REFERENCES

City of Parlier Economic Development Department. 2005. *City of Parlier Economic Profile*. Brochure. 4 pp.

DPR. 2005. *Environmental Justice Pilot Project – Project Objectives, Pesticides, and Community for Monitoring*. State of California Department of Pesticide Regulation. June 2005.

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